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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,548	11/08/2001	Geun-Young Yeom	YPL-0022	6773
7590 01/07/2004			EXAMINER	
Daniel F. Drexler Cantor Cloburn LLP 55 Griffin South Road Bloomfield, CT 06002			TRAN. BINH X	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 01/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,548

Applicant(s)

YEOM ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 4, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Albridge Jr. et al. (US 4,775,789).

Albridge Jr. discloses a method comprising:

extracting an ion beam having a positive charge from an ion source to accelerate the ion beam (Note: positive charge read on the limitation of "predetermined polarity");

reflecting an accelerated ion beam by a reflector to neutralize ion beam (Fig 1-6, col. 3-5);

positioning a substrate to be etched (32) in a path of a neutral beam to etch a material layer on the substrate (Fig 6, col. 6 lines 1-10).

Albridge fails to explicitly disclose the angle of the incidence of the ion beam on the reflector from a vertical line to a horizontal surface of the reflector. However, Albridge clearly teaches the angle of the incidence (θ) of the ion beam on the reflector with respect to the horizontal surface (See Fig 1). Any person has ordinary skill in the art would be able to calculate the angle of the incidence of the ion beam on the reflector from a vertical line to a horizontal surface of the reflector by subtracting θ from 90° ($90^\circ - \theta$). Claim 1 differs from the cited prior art by the specific angle value. Albridge clearly discloses the angle of incident of the ion beam is a result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal angle value as an expected result.

Respect to claim 4, Albridge teaches to adjust the gradient of the reflector to an incident beam (Fig 3, col. 3 line 55 to col. 4 line 20). Respect to claim 6, Albridge teaches that the reflector is metal or semiconductor (col. 6 lines 53-58).

4. Claims 1, 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motley et al. (US 4,662,977)

Motley discloses a method comprising the steps of:

extracting an ion beam from an ion source to accelerate the ion beam (col. 4 lines 60-63, Fig 1. Note: ion, positive or negative particles, by definition must have some predetermined polarity);

reflecting an accelerated ion beam by a reflector (50) to neutralize ion beam (Fig 1, col. 2-4);

positioning a substrate to be etched (46 or 48 or 49) in a path of a neutral beam to etch a material layer on the substrate (Fig 1).

Motley fails to explicitly disclose value of the angle of the incidence of the ion beam on the reflector from a vertical line to a horizontal surface of the reflector. However, Motley clearly teaches the angle of the incidence is a result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal angle value as an expected result.

Respect to claim 4, Motley teaches to adjust the gradient of the reflector to an incident beam (Fig 1). Respect to claim 5, Motley teaches to applying a voltage (via bias 54) to the reflector (50) to adjust a path of the incident ion beam (Fig 1a, Fig 1, col. 3). Respect to claim 6, Motley teaches that the reflector (50) is metal (col. 3 lines 31-40).

Response to Arguments

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5. Applicant's arguments filed 11-26-2003 have been fully considered but they are not persuasive.

The applicants argue that claimed invention requires that "the incident angle of the range of 75-85 ° with respect to the vertical line of the reflector such that all the incident ion beams are completely neutralized by the reflector without increasing the length of the reflector" (emphasis added). This argument is not commensurate with the scope of the claim. There is no limitation in the claim that indicates that all the incident ion beams are completely neutralized.

In response to applicant's argument that "the grazing angle of Albridge ... is merely a result effective variable. That is, Albridge discloses that angles of 1 to 4 degrees provide high efficiency of operation, but it does not disclose that the angles of 1 to 4 degrees are critical to obtain a controlled low energy", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Further, as discussed above, any person has ordinary skill in the art would be able to calculate the angle of the incidence of the ion beam on the reflector from a vertical line to a horizontal surface of the reflector by subtracting the Albridge's incident angle from 90 °. Since Albridge clearly discloses the incident angle are the result effective variable, the examiner still maintains that it would have been obvious to one

having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal angle value as an expected result.

With respect to Motley reference, the applicants argue that "the incident angles of 75°-85°, in claim 1, are not the mere result effective variable but the critical factors for the complete neutralization of the ion beam" (emphasis added). Again, this argument is not commensurate with the scope of the claim. There is no limitation in the claim that indicates the complete neutralization of the ion beam.

The applicants further argue "a neutralization plate (50 Fig 1), in Motley, is movable for directing plasma on the semiconductor wafer to be etched precisely, instead of neutralizing the incident ion beam completely" (emphasis added). Again, this argument is not commensurate with the scope of the claim. There is no limitation in the claim that requires the complete neutralization of the ion beam. Since Motley clearly discloses the incident angles are the result effective variable, the examiner still maintains that it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal angle value as an expected result

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not


mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran



ROBERT KUNEMUND
PRIMARY EXAMINER